NEW YORK COMMITTEE FOR OCCUPATIONAL SAFETY AND HEALTH
275 Seventh Avenue, 8th Floor, New York, NY 10001-6708 email nycosh@nycosh.org
(212) 627-3900 fax (212) 627-9812 website www.nycosh.org

December 4, 2000

Dave Halt, President
United Teachers of Northport
166 Laurel Road
East Northport, NY 11731

Dear Mr. Halt,

At your request and in your presence, on November 30, 2000, I conducted a preliminary indoor environmental assessment at Northport Middle School, 11 Middleville Road, Northport NY. The investigation was undertaken in response to long-standing staff concerns about adverse health effects which they believe are associated with exposure to mold and to other indoor environmental pollutants and conditions at the school.

The school building is a brick and cinder block edifice with several wings off a lengthy central corridor. It is primarily a one-story building erected on a concrete slab which sits on a gently sloping hillside. The unattached end of the "D" building (actually a wing rather than a separate building) extends out over the slope of the hill and is supported by cinder blocks instead of a slab, creating an enclosed crawlspace underneath. The slope of the hill is utilized in the gymnasium wing to create a second, basement floor.

The school was built in the 1950s and was utilized as a high school until approximately 1969. From that time it was used as a junior high school until approximately 1992, when it was closed due to a decline in the student population. For the next five years it remained closed and idle, although some sections were used periodically for district or community activities. It was reopened in 1997. The roof was repaired approximately one and a half years ago. The repair consisted of new applications of tar and gravel to the existing metal roof superstructure. At that time, roof-mounted exhaust ventilation fans were also replaced.

From the time of the reopening of the school in 1997, staff have complained of adverse health effects, including skin, eye, and respiratory irritation. Symptoms are said to alleviate upon exit from particular classrooms or from the school itself. Both students and teachers have been affected. Recently one or more teachers has received emergency hospital treatment as a result of adverse reactions while in the building.

The indoor environmental evaluation was funded by a grant to NYCOSH from the Hazard Abatement Board of the New York State Department of Labor under contract

#C008835. The walkthrough was limited to an investigation of the above stated issues and was not intended to be, nor should it be considered, a comprehensive safety and health evaluation.

Methodology

Two reports by Enviroscience Consultants, Inc., addressed to Ms. Barbara Salatto, Assistant Superintendent for Business, entitled "Microbial Indoor Air Quality Evaluations Northport Middle School October 27, 2000" and "Microbial Indoor Air Quality Evaluation and Fibers, and Particulate Evaluation Northport Middle School November 2-3, 2000" were reviewed. The reports identified elevated levels of fungi (mold) on the brick wall in the main hall opposite the main office, in the unit ventilator in room C34, in room C34 itself, and in a rock candy science project in room G53. (Please note that neither NYCOSH nor I have any personal, business, or financial relationship with Enviroscience Consultants, Inc., or with any of its principals or staff.)

Numerous incident reports filed by school staff documenting incidents, symptoms, and concerns were reviewed.

Faculty members were interviewed individually and in small groups. Maintenance and administrative personnel were also interviewed.

Areas of concern were visually inspected for plumbing, sanitary, and ventilation provisions. The presence or absence of odors was noted.

As this was a preliminary assessment, little use was made of instrumentation. A TSI VelociCalc Plus model 8360 air flow meter was used to determine air velocity in feet per minute (fpm) at some air supply and exhaust vents.

No sampling was performed. Sampling had already been conducted by Enviroscience. In any event, the United States Environmental Protection Agency (EPA) recommends sampling pollutant sources, if necessary, only after conducting a visual inspection, interviewing occupants and staff, and collecting additional information about occupant activities, ventilation systems; and pollutant pathways.[1] Measurement of indoor environmental contaminants in the initial stages of an investigation is usually not helpful in determining causes of symptoms and complaints except where there are strong or unusual sources or a proved relationship between a contaminant and a

[1] U.S. Environmental Protection Agency, Building Air Quality - A Guide for Building Owners and Facility Managers, U.S Government Printing Office, 1991, p. 45.

building-related illness exists.[2] Bulk, surface, or air sampling is not a prerequisite for remediation if fungal contamination is visually identified. In addition, air sampling methods for some fungi are prone to false negative results and cannot be used to definitively rule out contamination.[3] Occupant perceptions of the indoor environment may be more closely related to the occurrence of symptoms than to the measurement of contaminants.[4]

Indoor Environmental Quality

There are currently no enforceable federal, state, or local laws, regulations, or standards pertaining to indoor air quality. Several states, including New Jersey, and several professional organizations, including the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) have promulgated widely-used guidelines.

Numerous factors may affect the quality of indoor air. These may include, but are not limited to:

- poor design and/or inadequate maintenance of heating, ventilation and air conditioning (HVAC) systems, including the unit ventilators ("univents") commonly found in classrooms
- insufficient quantities of outside air delivered to occupants
- combustion sources, both indoor and outdoor
- environmental tobacco smoke
- volatile organic compounds (VOCs) from building materials, furnishings, or maintenance products
- cumulative effects of exposure to low concentrations of multiple chemical pollutants, including pesticides
- elevated concentrations of particulate matter
- ozone from outdoor air, laser printers, and other office machines such as photocopiers
- odors
- fiber glass or other man-made mineral fiber (MMMF) insulation
- microbiological contamination of ventilation systems or of interior space.

---

[2] Tubbs, Randy, and Seitz, Teresa, "Evaluation of Verbal Communication Problems and Indoor Environmental Quality at a Government Service Office," Applied Occupational and Environmental Hygiene, Vol. 15, No. 12, p. 871.

[3] New York City Department of Health (NYC DOH), Bureau of Environmental and Occupational Disease Epidemiology, Guidelines on Assessment and Remediation of Fungi in Indoor Environments, www.ci.nyc.ny.us/html/doh/html/epi/moldrpt1.html., p. 7.

[4] National Institute for Occupational Safety and Health (NIOSH), Hazard Evaluation and Technical Assistance Report: Library of Congress, NIOSH Report No. HHE88-364-2104, Centers for Disease Control, Cincinnati, Ohio, 1991.

Any examination of environmental air quality should consider the source(s) of odors or contaminants, possible design flaws or operational problems of the HVAC system, pathways between the sources and the location of the complaint(s), and the building occupants themselves. ASHRAE's most recently published ventilation standard recommends that outdoor air be supplied at a rate of 20 cubic feet per minute per person (cfm/person) for office spaces and 15 cfm/person for classrooms, reception areas, libraries, auditoriums, and corridors.[5] A second ASHRAE standard specifies conditions in which eighty percent or more of occupants would be expected to find the indoor environmental temperatures acceptable.[6] Assuming slow air movement and fifty percent relative humidity, the standard recommends a temperature range of 68 - 74° F in the winter and 73 - 79° F in the summer. The same standard also recommends that relative humidity be maintained at between 30 and 60 percent year round. Excessive humidity may support the growth of microorganisms, some of which may be allergenic or pathogenic.

Molds occur naturally and are always present indoors as well as outdoors. They usually pose no hazard to people. However, adverse health effects may result when indoor levels of mold are significantly elevated above outdoor levels or when different, more harmful types of mold are introduced into the indoor environment. Exposure to mold can cause irritation of eyes, nose, and upper respiratory passages, and skin rash. Symptoms may include burning eyes, congestion, cough, and post nasal drip. Some people become allergic to molds and develop hay fever or asthma symptoms such as itchy and watery eyes, congestion, coughing, sneezing, wheezing, and tightness of the chest. Some molds create toxins that can adversely affect the skin and the respiratory, immune, and nervous systems. Some molds may cause infection, including chronic sinus infection. Children, pregnant women, and immuno-compromised individuals may be particularly susceptible to infection. The major reason for mold growth indoors is moisture. Excessive moisture in combination with a substrate (organic material such as sheetrock, carpeting, paper, wood, etc.) can provide the nutrients necessary for mold to grow. Subsequent exposure may result in adverse health effects. Investigation and resolution of liquid water or moisture sources constitute the primary methods for limiting or preventing mold growth.[7] The underlying cause of water accumulation must be rectified or fungal growth will recur.[8] Effective alleviation or prevention of adverse health effects requires complete physical removal of mold and mold-contaminated

---

[5] American Society for Heating, Refrigerating, and Air-Conditioning Engineers, Inc., Ventilation for Acceptable Indoor Air Quality, ASHRAE 62-1999, Atlanta, Georgia, 1999.

[6] American Society for Heating, Refrigerating, and Air-Conditioning Engineers, Inc., Thermal Environmental Conditions for Human Occupancy, ASHRAE 5-1992, Atlanta, Georgia, 1992.

[7] American Industrial Hygiene Association (AIHA), Task Force Proposal for Quality Assurance Following Mold Remediation.

[8] New York City Department of Health, op cit.

subatrates by qualified workers trained in safe work practices.

Fiberglass batts or other man-made mineral fibers are often utilized for temperature and noise control. Exposure to fine fiberglass may be associated with detrimental impacts on pulmonary function and with other adverse health effects, including eye and respiratory inflammation and dermatitis. OSHA requires manufacturers of fiberglass to identify it as a potential carcinogen. Similar concerns apply to MMMF.

Chlordane is a manufactured pesticide that was widely used in the United States from 1948 to 1988, usually under the trade names Octachlor and Velsichol 1068. From 1983 to 1988, chlordane's only approved use was for termite control. It was applied underground around building foundations. In 1988, the Environmental Protection Agency withdrew its approval for use of chlordane, effectively making its use thereafter illegal. Exposure to chlordane is associated with risk of cancer, central nervous system damage, skin and mucous membrane irritation, and kidney and nerve damage. The current Occupational Safety and Health Act (OSHA) permissible exposure limit (PEL) for inhalation is 0.5 milligrams per cubic meter of air (mg/m^3) as an eight-hour time weighted average (TWA) concentration. The OSHA PEL also bears a "skin" notation, indicating that the cutaneous route of exposure, including skin, eyes, and mucous membranes, contributes to overall exposure. The OSHA standards are incorporated into New York State labor law and are enforced for public sector workers by the New York State Department of Labor Public Employee Safety and Health bureau (PESH).

Legal Requirements for School Facilities

The Regulations of the Commissioner of Education of the State of New York, 8 NYCRR 155, impose rigorous and specific health and safety requirements for educational facilities and for school construction projects.[5]

Section 155.2, Construction and Remodeling of School District Facilities, requires that all plans, specifications, and work regarding the erection, enlargement, repair, replacement, maintenance, or remodeling of occupied school facilities comply with the Uniform Safety Standards for School Construction and Maintenance Projects.

Section 155.4, Uniform Code of Public School Building Inspections, Safety Rating and Monitoring, requires annual building condition surveys or visual inspections, the first of which must be completed by November 15, 2000. The inspection is to include the building site itself, roofing, structural elements, exterior elements, interiors, electrical systems, plumbing, heating and cooling systems, ventilation systems, fire protection and security systems, and environmental and comfort features. The district health and safety committee must participate in the inspection.

---

[5] available on the internet at www.emsc.nysed.gov/facplan/Laws&Regs/-NYCTT155.5.15.CC.htm

Section 155.4 Subdivision (d) requires the implementation of a monitoring system and the establishment of a health and safety committee comprised of representation from district officials, staff, bargaining units, and parents. It also requires the investigation of all health and safety complaints, written response to all written complaints, and provision for public scrutiny of all such correspondence.

Section 155.5, Uniform Safety Standards for School Construction and Maintenance Projects, requires the establishment of procedures for the involvement of the health and safety committee to monitor safety during school construction projects. It also requires pre-planned emergency response procedures for construction-related incidents, including planning for relocation or evacuation. It also requires pre-construction notification to parents, staff, and the community. The notification is to include construction timetables and school safety requirements. It also contains specific requirements for the separation of construction areas from occupied spaces, for isolation of stairways, corridors, or elevators used by construction personnel, and for daily cleaning of affected occupied areas.

The same section imposes strict requirements for noise abatement and for control of chemical fumes, gases, and other contaminants during construction and maintenance projects. Volatile organic compounds (VOCs) introduced by glues, paint, furniture, carpeting, wall coverings, etc., must be allowed time to "off-gas" before reoccupancy of an affected area is permitted. Material Safety Data Sheets (as required by the New York State Right to Know Law) must be maintained at the site for all products used in the project and must be provided to anyone who requests them. Asbestos and lead paint abatement must be handled in accordance with specified protocols. Section 155.5 also requires participation in a post-construction inspection by the health and safety committee.

Observations

• *main hall opposite main office* -
White fungal growth is apparent on the interior side of the brick wall to a height of approximately three feet. This height corresponds to the height of the planter abutting the exterior side of the wall.

• *room C34* -
The unit ventilator was operating at the time of the walkthrough. An unidentifiable odor is apparent immediately upon entry to the room. The room is equipped with a single vent for mechanical exhaust ventilation on the corridor wall of the classroom. The ceiling consists of suspended rigid acoustical tiles, many of which are bowed or buckled. Approximately three to six inches above the ceiling tiles is the underside of the metal superstructure of the roof. Roofing screws protrude through the metal superstructure. I observed no evidence of roof leaks. Above the ceiling tiles are unsecured and unencapsulated batts of a type of man-made mineral fiber (MMMF).

possible fiberglass. I was unable to gain access to the interior of the univent. However, as best I could determine from the outside it appeared to be clean and free of visible moisture.

• *room D42* -
An exposed roof drainage pipe protrudes vertically from the center of the classroom ceiling, connects to an elbow and travels horizontally beneath the ceiling across the classroom to the corridor wall where it connects to another elbow. From there it runs vertically inside a small, poorly sealed chase to the crawl space beneath the classroom created by the cinder block construction and the slope of the hill. It is believed, but not verified, that the drainage pipe continues underground from there to a dry well further down the hill. The teacher in the room reports that condensation frequently forms on the pipe and drops to the desks and floor. No condensation or moisture was visible at the time of the walkthrough. The suspended ceiling in this room is comprised of flexible ceiling tiles integrally backed with what appears to be a form of MMMF, possibly fiberglass. Roofing screws protrude through the metal superstructure. I observed no evidence of roof leaks. Insulation on the interior of the removable cover of the unit ventilator is encrusted with a heavy layer of particulate matter and dirt, which may obscure possible mold growth. There is no provision for access to the crawl space. Recently, a small hole was punched in the cinder block wall, revealing that it is filled almost to the floor above with dirt and gravel. The direction and condition of the drainage pipe have not yet been determined. The teacher reports that chlordane was applied to the ground outside the classroom in the 1970s and that around 1984 the soil tested positive for chlordane. Subsequently, contaminated soil was removed. She does not know whether clearance tests were conducted or what the results might have been.

• *rooms D43 and D45* -
Teachers report frequent condensation on interior window surfaces. Moisture sometimes drips down onto, and possibly into, unit ventilators.

• *room G53* -
In this room, a recent science class experiment to crystallize rock candy resulted in abundant, visible mold growth over the course of one weekend. There are water stains on the tops of the wooden cabinets in the room. However, there is no evidence of ceiling leaks.

• *room G51* -
This room contains a large steel trap door in the floor, next to the exterior wall. Sewage odors are evident in this area of the room. Beneath the trap door is a vertical cylindrical tank, approximately three feet in diameter, depth undetermined, embedded in the ground. The cover of the tank itself is unsecured. The tank is full and contains what appears to be soil, rocks, and sewage. No pipes are visible.

• *room K75* -
Another rock candy experiment in this room also produced abundant visible mold growth. The science teacher in this room reports that the beakers used in this experiment and the cardboard boxes containing them had been stored in the preparation room located off room G52. She has retained one box, which contains visible black mold growth on its exterior.

• *preparation room off G52* -
This room reportedly suffered a major flood subsequent to roof repairs approximately one and a half years ago. The roof was re-repaired and staff report that no leaks have occurred since then.

• *physical education equipment storage room* -
Staff utilizing this basement room report that at the beginning of each school year, tennis rackets and other equipment stored here are covered with visible fungal growth and must be cleaned or discarded. The room is equipped with a double set of doors to the corridor, each with slatted vents. It is also equipped with a dehumidifier. The room has a single 6" x 18" vent for mechanical exhaust ventilation. I measured air velocity at this vent using a TSI VelociCalc Plus model 8360 air flow meter and determined it to be less than 40 feet per minute (fpm). Comparing this rate of mechanical exhaust ventilation to the size of the grill and the volume of the room, I calculated that this rate of ventilation provides this room with approximately 0.6 air changes per hour (ACH), a poor rate of ventilation.

• *exterior drainage* -
Some exterior walls are abutted by concrete water channels and metal drains. Staff report water incursion into corridors during inclement weather. Other exterior walls, including those with unit ventilators, abut exposed soil and grass. Staff report occasional puddles of water after storms beneath intake vents of unit ventilators.

Recommendations

1. Contaminated insulation on the inside of the unit ventilator in room D42 should be promptly removed and properly disposed of, strictly following the safe work procedures outlined in Section 3.1 of the NYC DOH Guidelines on Assessment and Remediation of Fungi in Indoor Environments. Interiors of all unit ventilators should be evaluated for cleanliness, evidence fungal growth and moisture, filter condition, and operation of thermostat, dampers, and timers, if any.

2. Northport Middle School should develop a written program for HVAC operations (unit ventilators as well as all other provisions for mechanically supplied and exhausted air) and maintenance which includes scheduled filter inspection and replacement, calibration of HVAC controls, inspection of ducts, dampers, and air handling units, and a procedure for responding to building occupant complaints.

3. All boxes and materials in the science preparation room off room G52 that were present at the time of the roof leak approximately one and a half years ago should be promptly examined for evidence of fungal contamination, strictly following the safe work procedures outlined in Section 3.1 of the NYC DOH Guidelines on Assessment and Remediation of Fungi in Indoor Environments. Contaminated or possibly-contaminated materials should be removed and disposed of properly.

4. Ceiling tiles backed with unencapsulated fiberglass or other man-made mineral fiber (MMMF) and loose fiberglass or MMMF batts above ceiling tiles should be removed as soon as possible. The work should be done when rooms are unoccupied, preferably over a weekend. Furniture should be temporarily removed or covered with plastic sheets. Workers should wear protective clothing, including gloves, long sleeves, and work clothes, while handling fiberglass or other MMMF. If local exhaust ventilation cannot be provided, NIOSH-approved toxic dust respirators should be worn. Rigid suspended ceiling panels should be dropped and the MMMF batts removed and bagged for disposal. Ceiling tiles integrally backed with MMMF should be similarly removed and bagged. The plenum between the suspended ceiling and the underside of the roof, and the classrooms, should be cleaned with a HEPA vacuum. Hard surfaces can be wet-mopped. Dusting, sweeping, and dry mopping are not appropriate as they may increase exposure.

5. The design, condition, and functioning of the sewage tank in room G51 should be evaluated by a licensed professional engineer.

6. Chlordane clearance test results from the 1980s should be obtained and evaluated. If test results are not available, consideration should be given to conducting additional tests.

7. The function and condition of the drain pipe through and under room D42 should be evaluated. Consideration should be given to rerouting the pipe along the exterior of the building rather than through the classroom.

8. The condition of the crawl space under room D42 should be evaluated for the presence of contaminants and the adequacy of ventilation and drainage. Permanent provision for access should be provided.

9. Provisions for outdoor drainage should be evaluated for adequacy. The presence of water puddles on exposed soil, particularly near air intakes, and the incursion of rainwater through corridor doors should be addressed.

10. Fungal growth on the brick wall in the main hall opposite the main office should

be cleaned, strictly following the safe work procedures outlined in Section 3.1 of the NYC DOH Guidelines on Assessment and Remediation of Fungi in Indoor Environments. The exterior of the wall abutting the outdoor planter should be waterproofed to prevent moisture intrusion and associated fungal growth.

11. A program to reduce or eliminate condensation through better use of insulation and temperature and humidity controls should be implemented.

12. Mechanical exhaust ventilation in the physical education equipment storage room should be increased to provide two to three air changes per hour, if possible. The dehumidifier, if used, must be rigorously cleaned and maintained so that it does not itself become a source of microbial contamination. Contaminated equipment can be cleaned as necessary using a solution of one part bleach and ten parts water strictly following the safe work procedures outlined in Section 3.1 of the NYC DOH Guidelines on Assessment and Remediation of Fungi in Indoor Environments.

13. Material Safety Data Sheets (MSDSs) for cleaning and maintenance products should be evaluated to determine if less toxic alternatives can be used.

14. Union and staff should be informed of all remediation efforts undertaken to date and of all remediation efforts planned for the future.

Please feel free to contact me at any time if I can be of further assistance.

Sincerely,

Dave Newman

David M. Newman, M.A., M.S.
Industrial Hygienist